

LAMPIRAN

LAMPIRAN 1 :Program Arduino

Sensor

```
void read_pressure(){
    int Pa = (analogRead(A0));

    //P = (V-125)*0.1;
    P = (0.1082*Pa) - 17.381;
}

void read_power(){
    PZEM004Tv30 pzem1(10,9);
    voltage = pzem1.voltage();

    if(String(voltage).indexOf("A") >0){
        voltage =0;
    }

    current = pzem1.current();
    if(String(current).indexOf("A") >0){
        current=0;
    }

    power = pzem1.power();
    if(String(power).indexOf("A") >0){
        power=0;
    }
}
```

```

    }
}

// Measure wind speed
void windvelocity()
{
    speedwind = 0;
    counter = 0;
    attachInterrupt(1, addcount, CHANGE);
    unsigned long millis();
    long startTime = millis();
    while(millis() < startTime + period) {}
    detachInterrupt(1);
}

void RPMcalc()
{
    RPM=((counter/jml_celah)*60)/(period/1000); // Calculate revolutions per minute
    (RPM)
}

void WindSpeed()
{
    speedwind = ((2 * pi * radio * RPM)/60) / 1000; // Calculate wind speed on m/s
    speedwind = speedwind/5.8;
}

void addcount()

```

```
{  
counter++;  
}
```

```
float maps(float x, float in_min, float in_max, float out_min, float out_max) {  
    return (x - in_min) * (out_max - out_min) / (in_max - in_min) + out_min;  
}
```

RTC

```
void time_read(){  
    Wire.beginTransaction(DS1307);  
    Wire.write(byte(0));  
    Wire.endTransmission();  
    Wire.requestFrom(DS1307, 7);  
    second = bcdToDec(Wire.read());  
    minute = bcdToDec(Wire.read());  
    hour = bcdToDec(Wire.read());  
    weekday = bcdToDec(Wire.read());  
    monthday = bcdToDec(Wire.read());  
    month = bcdToDec(Wire.read());  
    year = bcdToDec(Wire.read());  
}
```

```
void setTime(int jam,int menit,int detik,int hari,int bulan,int tahun,int nama) {  
    // "1 Sun | 2 Mon | 3 Tues | 4 Weds | 5 Thu | 6 Fri | 7 Sat - "  
    second = detik;  
    minute=menit;  
    hour=jam;
```

```

monthday=hari;
month=bulan;
year=tahun;
weekday = nama;

// Kode untuk mentransmisikan atau mengirimkan data ke RTC
Wire.beginTransmission(DS1307);
Wire.write(byte(0));
Wire.write(decToBcd(second));
Wire.write(decToBcd(minute));
Wire.write(decToBcd(hour));
Wire.write(decToBcd(weekday));
Wire.write(decToBcd(monthday));
Wire.write(decToBcd(month));
Wire.write(decToBcd(year));
Wire.write(byte(0));
Wire.endTransmission();
}

byte decToBcd(byte val) {
    return ((val/10*16) + (val%10));
}

byte bcdToDec(byte val) {
    return ((val/16*10) + (val%16));
}

String karakter(int jumlahbilangan){

```

```
String stringdata = String(jumlahbilangan);  
if (jumlahbilangan < 10){  
    stringdata = "0" + stringdata;  
}  
  
return stringdata;  
}
```

ARDUINO

```
#include <EEPROM.h>  
#include <Wire.h>  
#include <LiquidCrystal_I2C.h>  
#include <PZEM004Tv30.h>  
#include "RTCLib.h"  
  
#include <SPI.h>  
#include <Wire.h>  
  
#define pin_relay1 A1  
#define pin_relay2 9  
  
#define relay1_on digitalWrite(pin_relay1,LOW)  
#define relay1_off digitalWrite(pin_relay1,HIGH)  
  
#define relay2_on digitalWrite(pin_relay2,HIGH)  
#define relay2_off digitalWrite(pin_relay2,LOW)
```

```

// Pin definitions

# define windPin 3 // Receive the data from sensor

RTC_Millis rtc;

LiquidCrystal_I2C lcd(0x27, 16, 2);

byte second = 0;
byte minute = 0;
byte hour = 0;
byte weekday = 0;
byte monthday = 0;
byte month = 0;
int year = 0;
float voltage;
float current;
float power;
const int DS1307 = 0x68; // Alamat pin RTC pada arduino
// Variable definitions
unsigned int Sample = 0; // Sample number
unsigned int counter = 0; // B/W counter for sensor
unsigned int RPM = 0; // Revolutions per minute
float speedwind = 0; // Wind speed (m/s)

// Constants definitions
const float pi = 3.14159265; // pi number
int period = 1000; // Measurement period (milliseconds)
int delaytime = 1000; // Time between samples (milliseconds)
int radio = 90; // Distance from center windmill to outer cup (mm)

```

```
int jml_celah = 18; // jumlah celah sensor
```

```
String  
nama_bulan[]={ "", "January", "February", "March", "April", "May", "June", "July", "A  
ugust", "September",  
"October", "November", "December"};
```

```
String inputString = ""; // a String to hold incoming data  
bool stringComplete = false; // whether the string is complete
```

```
String last_day, last_month, last_year;  
String next_day, next_month, next_year;
```

```
float OffSet = 0.47; // nilai tegangan out sensor tanpa beban  
float OffSet2 = 0.47; // nilai tegangan out sensor tanpa beban
```

```
float V, P;
```

```
float V2, P2;
```

```
String xtanggal, xjam;
```

```
long last_millis;
```

```
long last_millis2;
```

```
int count;
```

```
int count2;
```

```
void setup() {
```

```
  Serial.begin(9600);
```

```
  pinMode(pin_relay1, OUTPUT);
```

```
  pinMode(pin_relay2, OUTPUT);
```

```
  lcd.begin();
```

```
  lcd.backlight();
```

```
relay1_off;
Wire.begin();
time_read();
xjam =karakter(hour)+":"+karakter(minute)+":"+karakter(second);
xtanggal = karakter(monthday)+"/"+karakter(month)+" ";

lcd.setCursor(0,0);
lcd.print(xjam);
lcd.print("|");
lcd.print(speedwind);
lcd.print(" ");

lcd.setCursor(0,1);
lcd.print(P);
lcd.print(" ");
lcd.print(current);
lcd.print(" ");
lcd.print((int)voltage);
lcd.print(" ");

}


```

```
bool error;
```

```
void loop() {
    time_read();
```



```

xjam =karakter(hour)+":"+karakter(minute)+":"+karakter(second);
xtanggal = karakter(monthday)+"/"+karakter(month)+" ";
read_pressure();
read_power();
windvelocity();
RPMcalc();
WindSpeed();
if (P<30 || P>120)
{
  relay1_off;
  error=true;
}else if (voltage<200 || voltage>245){
  relay1_off;
  error=true;
}else{
  error=false;
  relay1_on;
}
lcd.setCursor(0,0);
lcd.print("S:");
lcd.print(speedwind);
lcd.print("|P:");
lcd.print(P);
lcd.print(" ");

lcd.setCursor(0,1);
lcd.print("I:");
lcd.print(current);

```

```

lcd.print("A|V:");
lcd.print((int)voltage);
lcd.print("V  ");

if ((millis()-last_millis)>6000){
  last_millis=millis();

  String protokol =
"A"+String(P)+"B"+String(current)+"C"+String(voltage)+"D"+String(speedwind
)+"E"+error+"F";

  protokol = protokol+protokol.length()+"G";
  Serial.println(protokol);
}
delay(100);
}

```

Program Wemos

```

#include <ESP8266WiFi.h>
#include <ESP8266TelegramBOT.h>
#define durasi 2 // menit

char * id_boot = "806189769";

// Initialize Wifi connection to the router

char* ssid = "V2027"; // your network SSID (name)
char* pass = "123456789"; // your network key

// Initialize Telegram BOT

```

```

#define BOTtoken "1498095812:AAG__r3x--
RpLHbNCx054TjDCE5WOrVYx34" //token of FlashledBOT

#define BOTname "monitoringAC1"

#define BOTusername "monitoringAC1Bot"

TelegramBOT bot(BOTtoken, BOTname, BOTusername);

int Bot_mtbs = 1000; //mean time between scan messages
long Bot_lasttime; //last time messages' scan has been done
bool Start = false;
String pressure="0";
String current="0";
String voltage="0";
String wind="0";
String error="0";
bool sudah =false;
long last_millis,minute, second;
#define led_on digitalWrite(LED_BUILTIN,LOW)
#define led_off digitalWrite(LED_BUILTIN,HIGH)

void Bot_ExecMessages() {
  for (int i = 1; i < bot.message[0][0].toInt() + 1; i++) {
    bot.message[i][5]=bot.message[i][5].substring(1,bot.message[i][5].length());
    Serial.println("Pesan:"+bot.message[i][5]);
    Serial.println("ID:"+bot.message[i][4]);
    if (bot.message[i][5]=="cek" || bot.message[i][5]=="cek"){
      // String protokol = "Kondisi P:" +pressure+"Psi \nI:" + current+"A
\nV:"+voltage+"V \nWindSpeed:"+wind +" M/S";

```

```

    String protokol = "Kondisi Saat Ini P: " +pressure+" Psi | I: "+ current+" A |
V: "+voltage+" V | WindSpeed: "+wind +" M/S";

    bot.sendMessage(bot.message[i][4], protokol, "");

    Serial.println ("SEND CEK");

}else{

    bot.sendMessage(bot.message[i][4], "Format Error !!", "");

}

}

bot.message[0][0] = "";
}

void setup() {
    Serial.begin(9600);
    pinMode(LED_BUILTIN,OUTPUT);
    // attempt to connect to Wifi network:
    Serial.print("Connecting Wifi: ");
    Serial.println(ssid);
    WiFi.mode(WIFI_STA);
    WiFi.begin(ssid, pass);
    while (WiFi.status() != WL_CONNECTED) {
        led_on;
        delay(100);
        led_off;
        delay(100);
    }
}

```

```
Serial.println("");
Serial.println("WiFi connected");
Serial.println("IP address: ");
IPAddress ip = WiFi.localIP();
Serial.println(ip);
bot.begin(); // launch Bot functionalities
pinMode(2, OUTPUT); // initialize digital pin 2 as an output.
}
```

```
void loop() {
```

```
if ( WiFi.status() != WL_CONNECTED) {
```

```
led_on;
```

```
delay(100);
```

```
led_off;
```

```
delay(100);
```

```
}else{
```

```
led_on;
```

```
delay(1000);
```

```
led_off;
```

```
delay(1000);
```

```
}
```

```
if ((millis()-last_millis)>1000){
```

```
second=second+((millis()-last_millis)/1000);
```

```
if (second >60){
```

```

    minute++;
    second=0;
}
last_millis=millis();
}

if (minute>=durasi){
    String protokol = "Kondisi Saat Ini P: " +pressure+" Psi | I: "+ current+" A | V:
"+voltage+" V | WindSpeed: "+wind +" M/S";
    bot.sendMessage(id_boot, protokol, "");
    minute=0;
}
Serial.print("Durasi:");
Serial.print(minute);
Serial.print(":");
Serial.println(second);
if (Serial.available()) {
    String inChar = Serial.readStringUntil('\n');
    Serial.println("data masuk:" + inChar);
    kelola(inChar);
}
if ((millis() - Bot_lasttime)> Bot_mtbs) {
    bot.getUpdates(bot.message[0][1]); // launch API GetUpdates up to xxx
message
    Bot_ExecMessages(); // reply to message with Echo
    Bot_lasttime = millis();
}
delay(1000);
}

```

```

void kelola(String inputStringx ) {
    int a = inputStringx.indexOf("A");
    int b = inputStringx.indexOf("B");
    int c = inputStringx.indexOf("C");
    int d = inputStringx.indexOf("D");
    int e = inputStringx.indexOf("E");
    int f = inputStringx.indexOf("F");
    int g = inputStringx.indexOf("G");
    int fcs = inputStringx.substring(f + 1, g).toInt();
    int jml_data = inputStringx.substring(a, f + 1).length();
    if (fcs == jml_data && fcs > 0 && jml_data > 0) {
        pressure = inputStringx.substring(a + 1, b);
        current = inputStringx.substring(b + 1, c);
        voltage = inputStringx.substring(c + 1, d);
        wind = inputStringx.substring(d + 1, e);
        error = inputStringx.substring(e + 1, f);
        if (error=="1" && sudah==false){
            //String protokol = "Warning Sistem Error ! P: " +pressure+" Psi \nI: "+
            current+" A V: "+voltage+" V WindSpeed:"+wind +" M/S";
            String protokol = "Warning Sistem Error P: " +pressure+" Psi | I: "+ current+"
            A | V: "+voltage+" V | WindSpeed: "+wind +" M/S";
            bot.sendMessage(id_boot, protokol, "");
            sudah=true;
            Serial.println("KIRIM DATA:"+protokol);
        }else{
            sudah=false;
        }
        delay(1000);
        Serial.end();
    }
}

```

```

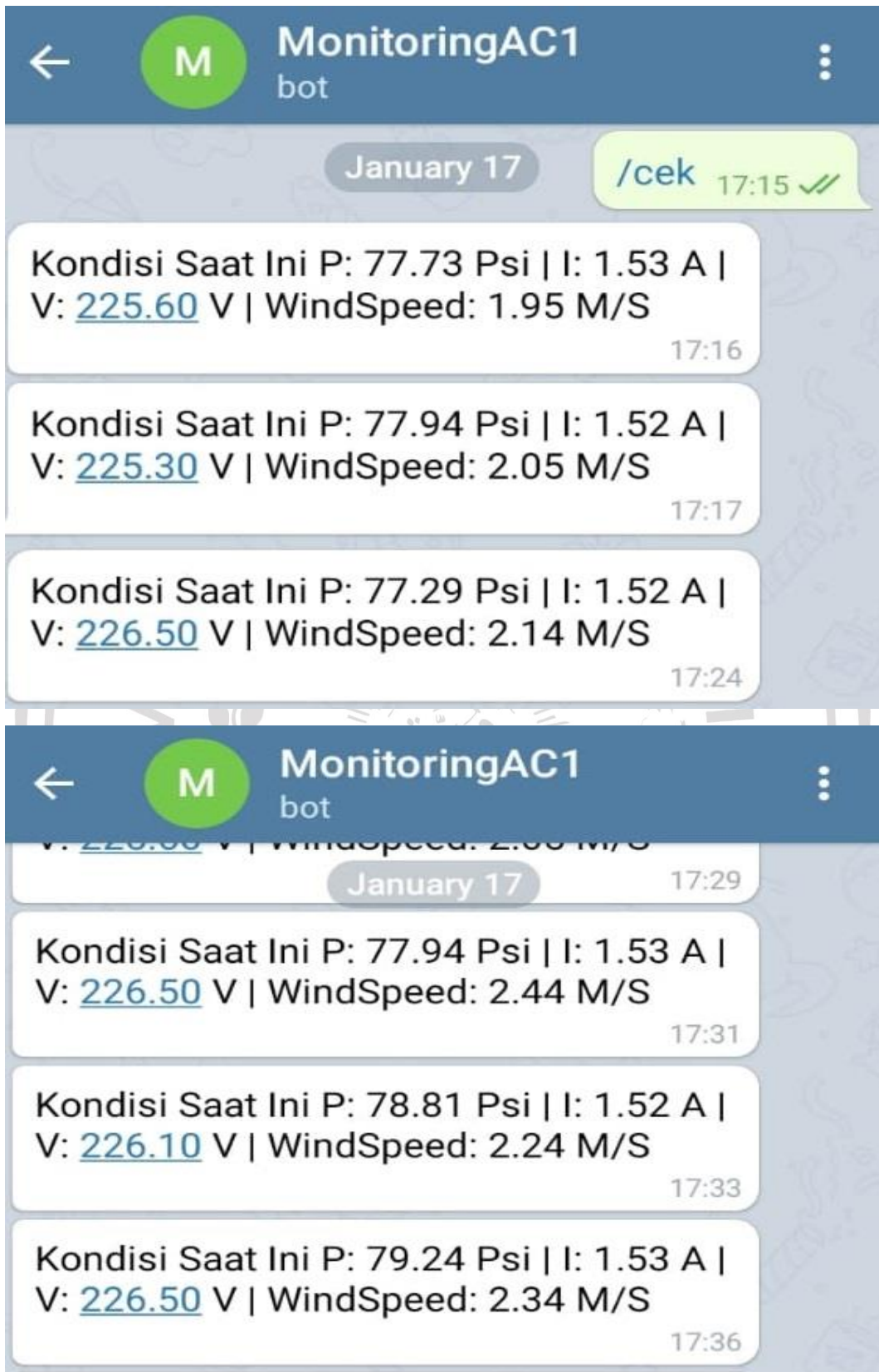
delay(1000);
Serial.begin(9600)
}

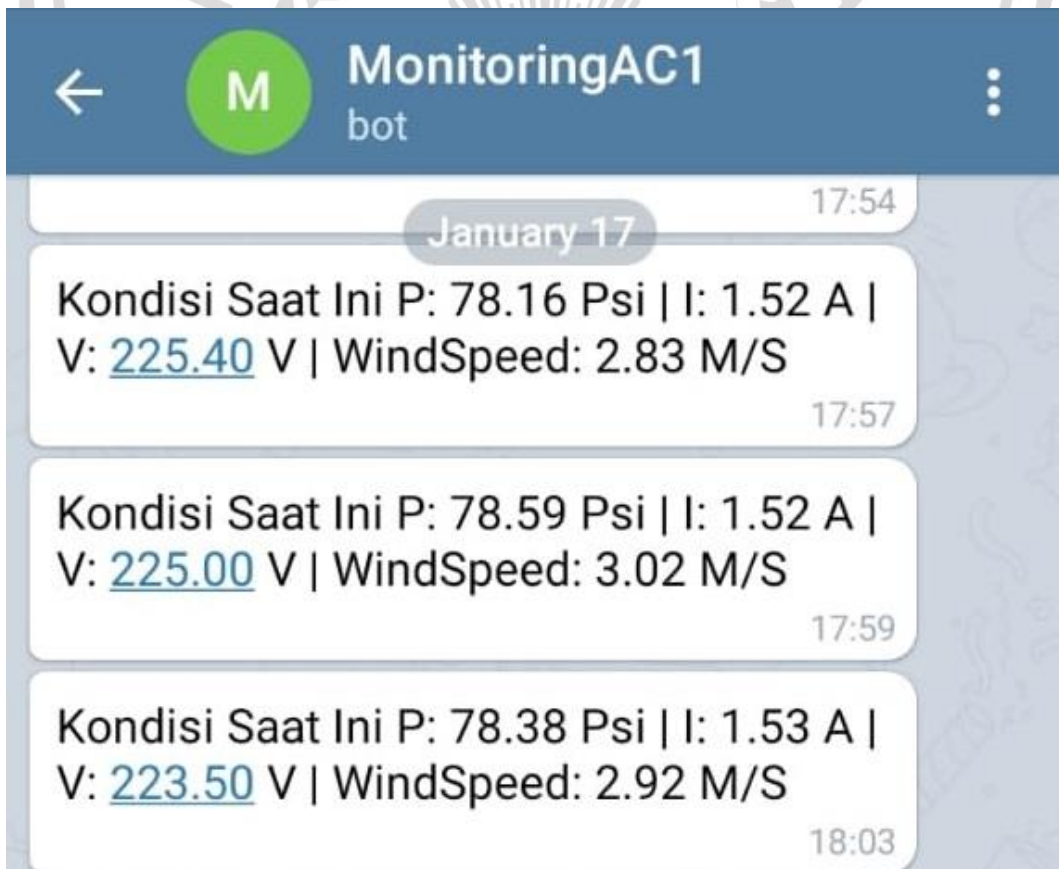
}

```

Lampiran ke 2: data pengukuran dengan alat monitoring dan telegram

No	Tanggal	Waktu	Tegangan Listrik (V)	Arus Listrik (A)	Tekanan Refrigerant (Psi)	Kecepatan Angin (m/s)	
						Level	K.Angin
1	17-01-2021	17.16	225	1,53	77,73	1	1.95
2	17-01-2021	17.17	225,30	1,52	77		2.05
3	17-01-2021	17.24	225,50	1,52	77,29		2.14
4	17-01-2021	17.31	226,50	1,53	77,94	2	2.44
5	17-01-2021	17.33	226,10	1,52	78,81		2.24
6	17-01-2021	17.36	226,50	1,53	79,24		2.34
7	17-01-2021	17.42	225,40	1,53	77,73	3	2.53
8	17-01-2021	17.45	225,70	1,53	79,67		2.63
9	17-01-2021	17.50	225,90	1,52	78,38		2.63
10	17-01-2021	17.57	225,40	1,52	78,16	4	2.83
11	17-01-2021	17.59	225	1,52	78,59		3.02
12	17-01-2021	18.03	223,50	1,53	78,38		2.92
13	17-01-2021	18.10	222,40	1,53	78,92	5	3.5
14	17-01-2021	18.13	222,20	1,52	78,38		3.31
15	17-01-2021	18.15	222,30	1,51	77,94		3.12





Kondisi Saat Ini P: 78.92 Psi | I: 1.53 A |
V: 222.40 V | WindSpeed: 3.51 M/S

18:10

Kondisi Saat Ini P: 78.38 Psi | I: 1.52 A |
V: 222.20 V | WindSpeed: 3.31 M/S

18:13

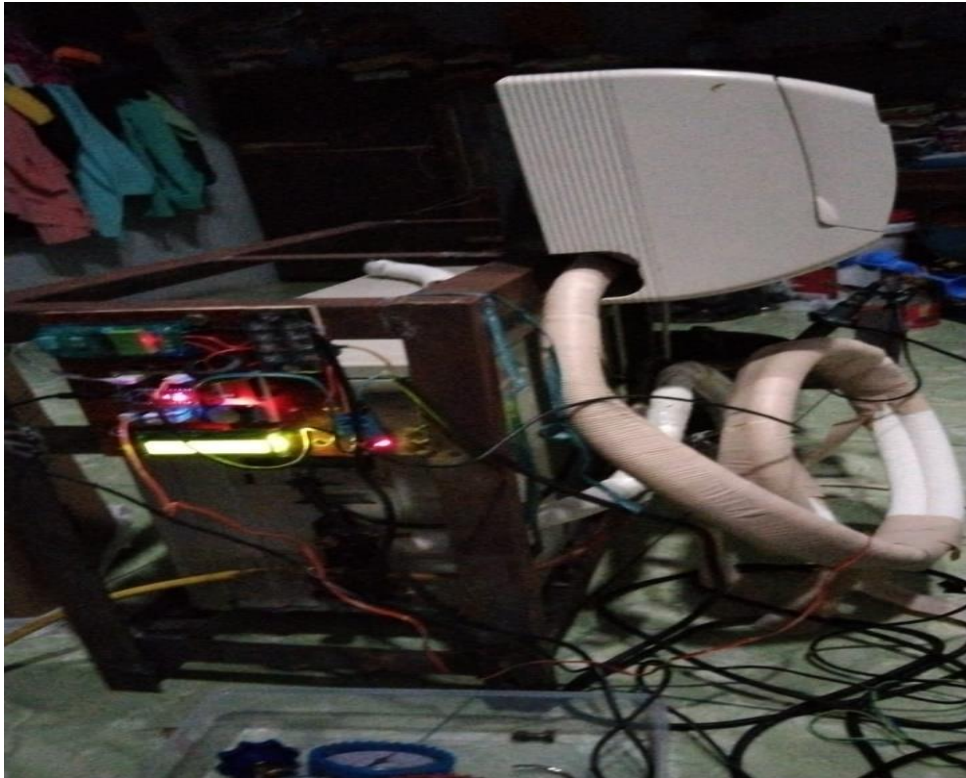
Kondisi Saat Ini P: 77.94 Psi | I: 1.51 A |
V: 222.30 V | WindSpeed: 3.12 M/S

18:15

Lampiran 3 :Foto Pengujian







Lampiran 4: daftar Riwayat hidup



A. BIODATA DIRI

1. Nama Lengkap : Moch.Izam Ardianto
2. Tempat, Tanggal Lahir : Gresik, 03 Agustus 1996
3. Jenis Kelamin : Laki - Laki
4. Kewarganegaraan : Indonesia
5. Tinggi, Berat badan : 168, 75 Kg
6. Golongan Darah : -
7. Agama : Islam
8. Status : Lajang/Belum Kawin
9. Alamat :Desa Sumari Rt 06/Rw 02
Kec.Duduksampeyan Kab.Gresik
10. No Handphone : 081235067627
11. Email : izamardianto67@gmail.com

B. RIWAYAT PENDIDIKAN

1. 2000 – 2002 : TK RAM DS. SUMARI
2. 2002 – 2008 : MI DA'WATURROSYIDIN SUMARI
3. 2008 – 2011 : SMPN 1 DUDUKSAMPEYAN
4. 2011 – 2014 : SMK DARUTTAQWA SUCI MANYAR
5. 2016 – 2021 : UNIVERSITAS MUHAMMADIYAH
GRESIK

SURAT PERNYATAAN

Saya yang bertanda tangan di bawah ini :

Nama : Moch.Izam Ardianto

NIM : 16632019

Alamat : Desa Sumari Rt 06/ Rw 02 Kec.Duduksampeyan Kab.Gresik

Menyatakan dengan sesungguhnya bahwa skripsi yang berjudul :
“SISTEM MONITORING PERAWATAN AIR CONDITIONER (AC) TIPE
SPLIT WALL BERBASIS IoT “ Benar-benar merupakan hasil karya yang
saya buat sendiri berdasarkan penelitian yang telah saya lakukan (**bukan
*plagiat***).

Demikian pernyataan ini saya buat, jika ternyata dikemudian hari
pernyataan ini tidak benar maka saya siap menanggung semua resiko
berdasarkan hukum dan peraturan yang berlaku.

Gresik, 29 Januari 2021

Hormat saya,

(Moch.Izam Ardianto)

Nim : 16632019